Machinery and Tools as they are.

Since it is now certain that a World's Fair will shortly be held within our city, and that we may confidently expect a competition with foreign rivals for the prize of superiority, we have resolved to give our readers a synopsis of the present condition of Machinery, Operatives' Tools, and other apparatus employed in Manufactures, the Arts, and Handicraft in general. This account will not be limited to those in use in our own country, but will also comprise the newest improvements abroad, our aim being *not to tell* our artificers what *they already know*, but to give them information on subjects where they may be ignorant.

Our own epoch is most opportunely suited for such a purpose, as the late World's Fair in London brought together not only the fabrics, but many of the tools and much of the machinery of the workers of different nations. From their inspection much has been learned, namely, by what means the artificer of one nation excelled the artificer of another, and where the superiority lay. Moreover, from the prizes offered, the inventive skill of different nations was stimulated, and consequently much improved machinery was exhibited from the various workshops of the world, that would otherwise probably have never been produced, at least not for a longer period of time. The universal competition acting as a stimulant to precocious invention. There have therefore been lately introduced several improvements in the machinery and tools of many branches of art and manufacture, with which, doubtless, a large portion of our artizans and mechanics are unacquainted. It will consequently be serviceable to those who intend to exhibit, at the approaching New York World's Fair, to know what has been already done, and what improvements have been made not only in America but also in Europe, as competition may be expected from their people, as well as from our own. For this purpose we propose to give in our columns a series of articles on the above-named subjects, not merely a bare catalogue of names, but containing such information as will be of use to our readers. We must, however, premise that our remarks will, of course, be directed to those employments where striking improvements have been made; as our aim is to furnish information, it would be useless to dilate where there is nothing to be said. Where no new improvements have been made, no fresh information can be afforded. As we observed before, our purpose is to make our people acquainted with many processes of which, perhaps, they are ignorant, not from any deficiency on their part, but from natural circumstances over which they can exercise no control. Such collections as were exhibited in the London Crystal Palace, and will be, we expect, exhibited in the New York Crystal Palace, can not otherwise be amassed together. Distance of country, difference of language, want of time, and want of pecuniary means, prevent that general international communication which would tend so much to the spread of knowledge, so that it is only by such extraordinary efforts as a World's Fair that the mechanical knowledge of each separate division of the world can be known. In addition to what has been already said, many improvements are unknown, from being confined to a single locality, and sometimes even to a particular factory; these we shall endeavor to bring out, if possible, from their obscurity for the universal good; others, although patented, are not generally known, from negligence in making them public, and this latter category includes a greater number of valuable improvements than might be supposed. Improvements being often dropped from want of encouragement, or want of means to publish their advantage. Moreover, if such information were more widely spread, much inventive skill that is now idly, or rather uselessly, employed upon inventions that have already been made, would be diverted to a more profitable direction. It is not uncommon for several individuals to be exercising their ingenuity in discovering what has been already discovered, and although their invention does them infinite credit on the score of talent, to find it anticipated on the score of personal benefit. We would, however, wish it to be understood that it is our intention to give only a *resume* of the present state of machinery, &c., and that, therefore, particular inventions, unless of very material importance, cannot expect to be discussed. Unless some such arrangement is determined upon, it would be an endless task to notice every new invention which claims to itself the fact of being an improvement.

Those improvements, therefore, can only be noticed which have received the stamp of general approbation, or have gained the title by being brought into general use, or, finally, which bear evident proofs of deserving it.

In the choice of these latter, discretion and judgment will be used, for it should be recollected that every change is not an improvement. However ingenious an invention may be, especially in machinery and working tools, it cannot be called an improvement unless it is a change for the better, to suppose otherwise would be a contradiction not only of sense but of words. We shall therefore conclude for the present, hoping, in the number of next week, to commence performing what we have promised in this.

(To be Continued.)

British Association for the Advancement of Science.

(Concluded from page 59.)

DIAMONDS.—Mr. Tennent read a paper on the Koh-i-noor diamond. He considered the great Indian diamond, the Russian diamond, and Koh-i-hoor, were separate portions of the original Koh-i-noor procured from the mines of Golconda. That opinion was supported by the peculiar relation of the cleavage planes to the other sides, which could not otherwise be accounted for. A very interesting discussion ensued, in which Professor Tennent described the progress already made in the grinding and polishing of what he called the English portion of this far-famed stone. Referring to the diamonds procured in the Brazils, he related a fact which, he said, was told to him by a gentleman from Brazil. A slave in that country was one day wading in a river in search of the precious gems to be found imbedded in the strand, when he struck his crow bar in a spot which surprised him by its hollow sound. He repeated its blows, and soon struck the iron through a crust of siliceous particles cemented together by oxide of iron. On removing the concrete mass, the slave discovered a bed of diamonds, which were afterwards disposed of for £300,000. Such an immense number of diamonds being thrown upon the market, so overstocked it that nearly all the dealers became bankrupt, and upon the diamonds being introduced into England, the glut was so great that the results to the trade were equally disastrous, only three English houses being able to stand up against it. One of those persons was a gentleman in Leadenhall street, who was so largely engaged in the trade, that he had actually shown him (Mr. Tennent) a peck full of diamonds.

Sir David Brewster entered into some account of the same diamond. He said—In the course of last spring, I was requested by H. R. H. Prince Albert to give my opinion respecting different forms into which it was proposed to reduce the Koh-i-noor diamond, in order to make it an ornamental gem. In the state it then was, it exhibited an inferior display of colors to its glass model, and it was only by surrounding it by a number of vivid lights that its colored refractions could be developed. Having had occasion to observe some remarkable phenomena in small portions of diamond, an account of which was published in the Transactions of the Geological Society for 1836, I was desirous of examining so large a mass of diamond as the Koh-i-noor, before it was reduced in size, and covered with facets which would not permit it to be examined. His Royal Highnessreadily granted my request, and I had thus an opportunity of submitting it to the scrutiny of polarised light. In place of producing no action upon this species of light, as might have been expected from its octohedral structure, it exhibited streaks of polarised tints, generally parallel to one another, but, in some places, of an irregular form, and rising to the yellow of the first order of colors. These tints and portions of polarised light were exactly the same as those which I had long ago found in many other diamonds, and published in the Edinburgh Transactions for 1815 and 1816. In placing the Koh-i-noor under a microscope of considerable power, I observed in it, and also in each of the two small diamonds which accompanied it, several minute and irregular cavities surrounded with sections of polarized light, which could only have been produced by the extensive action of a compressed gas, or fluid that had existed in the cavities when the diamond was in a soft state. In an external cavity, shown in the model, and which had been used for fixing the gold setting, I observed with common light a portion of yellow light, indicating a yellow substance. Mr. Garrard and others considered it as gold rubbed off the gold setting; but as gold is never yellow by transmitted light, I considered the color as produced by a yellow solid substance of unknown origin. Sir Henry de la Beche having suggested to me that it would be desirable to make a general examination of the principal diamonds in London, I went next day to the British Museum, and found there an excellent specimen, which threw some light on the yellow solid to which I have referred. This specimen was a piece of colorless diamond, uncut, and without any crystalline facets, about three or four-tenths of an inch broad, and about the twelfth of an inch thick, and on its surface there lay a crystal of yellow diamond, with the four planes of semi-octohedron. This singular fact was illustrated by a large model placed beside it. Upon examining the original I noticed a pretty large cavity in the thickness of the specimen, with the extremity of which the yellow octohedron was connected, and finding a portion of amorphous yellow diamond in the other end of the cavity, I had no doubt that the yellow crystal had emerged, in a fluid state, from the cavity when it was accidentally opened, and had immediately crystallized on the surface of cleavage, I am well aware that such an opinion makes a good demand upon the faith of the mineralogist, but to those who have seen as I have done, the contents of fluid cavities, in crystal, solidifying, and even crystallizing in the face of the cleavage, while another portion of the contents of the cavity escaped in gas—to those who have seen in the topaz cavities numbers of regularly formed crystals, some of which, after being fused by heat, instantly re-crystalize, the conclusion I have drawn will be stripped of its apparent extravagance. In examining a number of diamonds in the Museum of the East India Company, to which Col. Sykes kindly obtained me access, and about forty or fifty in the possession of Messrs. Hunt and Roskell, I found many containing large and irregular cavities of the most fantastic shapes, and all of them surrounded with irregular patches of polarized light, of high tints, produced, undoubtedly, by a pressure from within the cavities, and modified by their form. Among these specimens I found one or two black diamonds, not black from a dark coloring matter like that in smoky quartz, but black from the immense number of cavities which it contained. Tavernier has described a large and curious diamond which throws some light on the subject of this notice. It contained, in its very centre, a large black cavity. The diamond merchants refused to purchase it. At last a Dutchman bought it, and by cutting it in two, obtained two very fine diamonds. The black cavity through which he cut, was found to contain eight or nine carats of what Tavernier calls black vegetable mud.

[This is a subject which we know will greatly interest Prof. Horsford of Cambridge.

The Village of Piedmont, Va.

This little village, situated in Hampshire Co., Va., opposite Westernport, Maryland, is the creation of the Baltimore and Ohio Railroad. The Cumberland Journal says:—It is beautifully located at the foot of the Alleghenny mountains, and is surrounded by an amphitheatre of hills. Here is located the splendid engine house of the company, and here are to be its machine shops, unless it should be determined to continue them at Cumberland. The village already boasts its stores, warehouses, hotels, and private dwellings. Around it, on the sides of the mountains, are rich veins of semi-bituminous coal. Above it, a mile or two, is the mouth of Savage, where coal also abounds. Already are the coal properties in this region coming into demand, and we hear of recent sales that indicate an enormous rise in value. The New Creek Company are about to commence operations not far from the mouth of Savage, and several individual proprietors will likewise begin to open out in a short time. It is reduced to a certainty that the second track on the Baltimore and Ohio Railroad will be soon required for our coal trade.

Improved Telegraph Instrument

Mr. Clarke, of Philadelphia, exhibited at the late fair of the Franklin Institute held in that city, a very useful improvement in the telegraph register. By the ordinary arrangement, the operator has to use a key for winding up the register, but by Mr. Clarke's plan the register is self-winding. The winding motion is obtained by an extra magnet being placed in the register, and the closing and breaking of the circuit causes a lever to vibrate. This lever has a click at its end, acting in a small steel ratchet wheel, which causes the latter to revolve and transmit its motion by wheel gearing to the shaft of a spring contained in a box, like a watch. A spring is used for a motive power to the train of wheels, instead of a weight, as in the ordinary register. There is also an arrangement by which it ceases winding when the spring is wound to the power necessary to revolve the train of wheels. This is effected by two points coming in contact, and establishing a cross-current, which cuts off the current from the winding magnet, until, by its running, it causes the two points to separate, when the current flows through the magnet again, and the winding is continued. Another advantage of this improvement consists in the fact of a uniformity of motion throughout any number of messages being obtained.

Increased Use of Guano.

The Fredericksburg (Va.) Herald says the application of guano the last season or two, has been so highly satisfactory, that many farmers are operating on a large scale this fall. One produce house in that city has received an order for fifty tons from a Rappahannock farmer, and another for thirty tons. The Herald says:—

We have also had cited to us several instances wherein practical results were shown from the application of guano. One gentleman, whose means were rather limited, commenced a few years ago by the application of fifty pounds. At that time his farm raised a bare sufficiency of corn to support the ordinary want of his household and stock, whilst in the way of wheat he had but a small quantity to sell. He increased the application gradually as his increased crops allowed, until this year he has one hundred and fifty barrels of corn to sell, besides a very fair crop of wheat. He is able to apply what will be equal to about four tons of guano this fall, when but a few years since his means allowed him an application of only fifty pounds.

Manificent Donation.

Joshua Bates, a partner in the firm of Messrs. Baring, has conferred a donation of $50,000 towards the forming of a public library in Boston. The only condition is, that the building shall be an ornament to the city—that there shall be room for one hundred to one hundred and fifty persons to sit at reading tables—that it shall be perfectly free to all, with no other restrictions than may be necessary for the preservation of the books.

A Huge Man-of-War.

The English are busily employed in introducing screw propellers into their men-of-war; and so far as their navy is concerned, are determined to be always ready for action. The first-class British line-of-battle ship Windsor Castle, a three-decker, originally constructed for a battery of one hundred and twenty guns, was, a short time since, cut asunder at midships, and lengthened twenty-three feet, to furnish a suitable space for the accommodation of screw propelling machinery. She has just been launched, and her name is changed to that of the "Duke of Wellington." She measures nearly 4,000 tons, and mounts 140 guns. With her steam facilities she is probably the most formidable as well as the largest man-of-war afloat. The largest ship in the French navy is the screw propeller Napoleon.